

NASA TECH BRIEF

Marshall Space Flight Center



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Flammability Control for Electrical Cables and Connectors

The problem:

Unprotected electrical cables and connectors are a serious fire hazard in an oxygen-enriched atmosphere. The basic reason is that electrical cables and many connectors are insulated with nonmetallic materials which easily ignite and burn in the oxygen-concentrated surroundings. One common method for containing such fires requires that electrical wiring be enclosed in conduit and metal boxes. This procedure is costly, adds unnecessary weight to electrical systems, and complicates maintenance.

The solution:

A new technique of covering fire-hazardous sections of electrical wiring with fireproof materials prevents fires from spreading in oxygen-enriched atmospheres and eliminates the use of heavy metal enclosures.

How it's done:

The first step in this technique requires a thorough examination of the entire electrical and electronics wiring that will be exposed to the oxygen-enriched atmosphere. Next, all of the sections that present a fire hazard along the cables and connectors are located. Once located, several types of nonflammable materials are used to cover these sections, depending on the type of wiring and connectors.

One material used to cover the potting on connectors is made from a Teflon-coated Beta cloth. The cloth comprises special nonflammable fiberglass. It is wrapped around connector interfaces in a double layer and sewn with a Teflon sewing thread. Other components covered

with this material include exposed wire bundles and toggle and rotary switches. The material is also used to fill holes that pass wires into panels.

Another material used to cover the potting on ground terminals is Fluorel, a nonflammable fully-saturated fluorinated polymer. Other wire bundles not covered by these nonflammable materials are protected by aluminum or polyimide enclosures.

This technique described in detail in an available document substantially reduces the fire hazards in oxygen-enriched environments.

Notes:

1. The technique may be of interest to designers of electrical and electronics equipment that will be used in oxygen-enriched environments: in hospitals, aircraft, underwater systems and spacecraft.
2. Requests for further information may be directed to:
Technology Utilization Officer
Marshall Space Flight Center
Code A&PS-TU
Marshall Space Flight Center, Alabama 35812
Reference: B73-10235

Patent status:

NASA has decided not to apply for a patent.

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